



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,769	02/25/2002	George G. Barclay	51065	4396
21874	7590	12/11/2003		
EDWARDS & ANGELL, LLP				
P.O. BOX 9169				
BOSTON, MA 02209				
EXAMINER				
THORNTON, YVETTE C				
ART UNIT		PAPER NUMBER		
1752				

DATE MAILED: 12/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/082,769	<b>Applicant(s)</b> BARCLAY ET AL.	
	<b>Examiner</b> Yvette C. Thornton	<b>Art Unit</b> 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

This is written in reference to application number 10/082769 filed on February 25, 2002 and published as US 2002/0187420 A1 on December 12, 2002. The said application claims priority to provisional application 60/271404 filed on February 25, 2001.

#### *Response to Amendment*

1. Claims 1-25 have been cancelled. Claims 26-46 are currently pending.

#### *Claim Objections*

2. Claim 26 is objected to because of the following informalities: there is a typographical error in line 4 of the said claim. Appropriate correction is required.

#### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

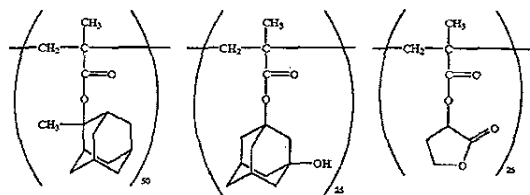
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

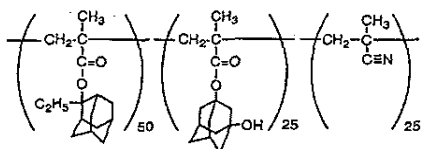
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 37-40 and 42-46 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Fujishima et al. (EP 982628 A2) with Rahman et al. (US 6610465 B2) cited to show inherent properties. Fujishima exemplifies the synthesis of resin A and resin H that

have the following structures:



(resin A; p. 0035)



(resin H; p. 0043). See also resins C, D, I and J. Example

7 forms a photoresist composition comprising resin H; p-tolyldiphenylsulfonium trifluoromethanesulfonate as an acid generator; 2,6-diisopropylaniline as a quencher; and 2-heptanone as the solvent. The said composition was applied to a silicon wafer; exposed using a KrF excimer stepper; and developed to form a pattern (p. 0047-0049). Example 11 forms a photoresist composition comprising resin A; p-tolyldiphenylsulfonium perfluorooctane sulfonate as an acid generator; 2,6-diisopropylaniline as a quencher; and propylene glycol monomethyl ether acetate and  $\gamma$ -butyrolactone as the solvent mixture. The said composition was applied to a silicon wafer; exposed using an ArF excimer stepper; and developed to form a pattern (p. 0052-0054). See also example 3.

It is the examiner's position that the second monomer in each of resins A and H meets the limitation of a hydroxyadamantyl moiety. The third monomer of resin A meets the limitations of a lactone which is readily acid labile. The hydroxyadamantyl methacrylate is also readily acid labile. This position is supported by the teachings of Rahman which discloses that 3-hydroxy-1-methacryloyloxyadamantane,  $\beta$ -methacryloyloxy- $\gamma$ -butyrolactone and  $\alpha$ -methacryloyloxy- $\gamma$ -butyrolactone are examples of acid labile (meth)acrylates (c. 6, l. 56-

63). The third monomer of resin H meets the limitation of a nitrile moiety as set forth in instant claim 40. The first monomer of each of the resin A meets the limitation of an alicyclic acid labile ester group as set forth in instant claims 39. Furthermore the examiner is of the position that a silicon wafer meets the limitation of a microelectronic wafer substrate as set forth in instant claim 46.

Although, Fujishima fails to exemplify a polymer comprising a polymer that is a tetrapolymer it clearly teaches that taught resin (I) having recurring units of formula (I), (II) and (III) may also have polymerization units of formula (IV)  $\alpha$ -methacryloyloxy- $\gamma$ -butyrolactone or formula (V) maleic anhydride (p. 0008-0011). One of ordinary skill in the art would readily envisage a tetrapolymer comprising recurring unit of formula (I), (II), (III) such as that exemplified in resin H and a recurring unit of formula (IV) or formula (V) as disclosed in paragraphs 0008-0011.

***Claim Rejections - 35 USC § 103***

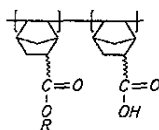
5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 26-36 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima et al. (EP 982628 A2) with Rahman (US 6610465 B2) as applied to claims 37-40 and 42-46 above in further view of Willson et al. (US 6103445 A). Fujishima, as discussed above, teaches all the limitations of the instant claims except the presence of one or more

Art Unit: 1752

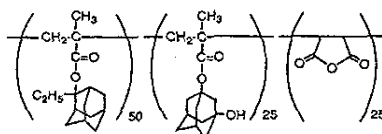
norbornene repeating units (instant cl. 41) or at least two distinct polymerized norbornene repeating units (instant cl. 26-36). Willson teaches that the cycloaliphatic backbone of



polymers having the generic formula:

(Fig. 1) serves to provide dry etch-

resistance and thermal stability and also serves to tether the pendant functionalities required for imaging. The said system also has high sensitivity. The said polymer introduces a pendant acid cleavable group, which enhances adhesion and solubility of the material in aqueous base developing solvent (c. 15, l. 1-28). It is the examiner's position that the said generic formula meets the limitations of two distinct norbornene repeat units as set forth in instant claim 26. One of ordinary skill in the art would have been motivated by the teachings of Willson to incorporate cycloaliphatic backbones having the said generic formula into the exemplified resins A, D or H of Fujishima in order to improve dry etch-resistance, thermal stability as well as sensitivity, adhesion and solubility of the formed material. Resin



D of Fujishima has the formula:

which introduces an

anhydride moiety as set forth in instant claim 29.

### *Response to Arguments*

7. Applicant's arguments filed September 29, 2003 have been fully considered but they are not persuasive. Applicants argue that the claimed inventions of claims 26 and 37 are not disclosed by the prior art reference of Fujishima. The examiner respectfully disagrees for the

reasons set forth above. Specifically, example 7 and example 11 of Fujishima clearly anticipates the claimed invention wherein the claimed composition comprises a polymer having a hydroxyadamantyl moiety and at least two distinct repeat units that each have a photoacid labile group. Furthermore, one of ordinary skill in the art would have been motivated by the teachings of Willson to incorporate recurring units having cycloaliphatic backbones of the said generic formula into the exemplified resins A, D or H of Fujishima in order to improve dry etch-resistance, thermal stability as well as sensitivity, adhesion and solubility of the formed material.

8. The examiner hereby withdraws the rejections of the previous office action over Miyake et al. (JP 11-109632), Okino et al. (US 6303266) and Uetani et al. (US 2001/0039080).

#### *Conclusion*

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

10. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action.

Art Unit: 1752

In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 703-308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

13. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.



ycd  
December 7, 2003

MARK F. HUFF  
SUPERVISOR, EXAMINER  
TECHNOLOGY CENTER 1700